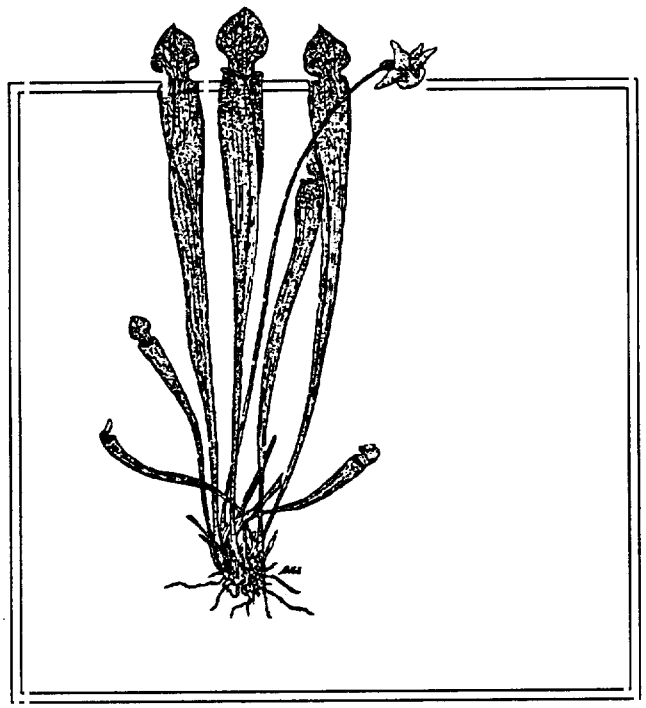
RECOVERY PLAN

Alabama Canebrake Pitcher Plant



U.S. Fish and Wildlife Service

ALABAMA CANEBRAKE PITCHER PLANT

(*Sarracenia rubra* ssp. *alabamensis*)

Recovery Plan

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for the

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Date: October 8, 1992

Recovery plans delineate reasonable actions which are believed to be required to recover and/or protect listed species. Plans are prepared by the U.S Fish and Wildlife Service, sometimes with the assistance of recovery teams, contractors, State agencies, and others. Objectives will only be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints. Recovery plans do not necessarily represent the views nor the official positions or approvals of any individuals or agencies, other than the U.S. Fish and Wildlife Service, involved in the plan formulation. They represent the official position of the U.S. Fish and Wildlife Service only after they have been signed by the Regional Director or Director as approved. Approved recovery plans are subject to modification as dictated by new findings, changes in species' status, and the completion of recovery tasks.

Literature citation should read as follows:

U.S. Fish and Wildlife Service. 1992. Alabama Canebrake Pitcher Plant Recovery Plan. Jackson, Mississippi. 21 pp.

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EXECUTIVE SUMMARY

Current Species Status: The Alabama canebrake pitcher plant is endemic to three central Alabama counties. Its known current distribution is limited to 12 sites. Most of these remaining sites are small. Over 50 percent of this species' populations have been lost through habitat destruction, succession (due to fire exclusion), overcollecting, and adverse land use practices. Extant populations continue to be threatened by these factors. This species is listed as endangered without critical habitat.

Habitat Requirements and Limiting Factors: This carnivorous plant occurs in sandhill seeps, swamps, and bogs along the fall-line of central Alabama. Encroachment of competing woody vegetation, resulting from changes in fire cycles and altered hydrology, limit its distribution and abundance. Plant dealers and hobbyists have exacerbated these adverse effects by over-collecting.

Recovery Objective: Reclassification to threatened status.

Recovery Criteria: Sarracenia rubra ssp. alabamensis will be considered for reclassification to threatened status when there are 10 viable populations which are being appropriately protected and managed. Population viability should be confirmed through periodic monitoring for at least a 15-year period.

Actions Needed:

1. Protect populations and habitat.
2. Survey for additional populations.
3. Evaluate habitat needs and implement appropriate management.
4. Conduct species' biology studies.
5. Preserve genetic stock.
6. Establish new populations and/or enhance existing sites.
7. Develop a public awareness program.

Total Estimated Cost of Recovery: Since little is known about actions needed to recover this species, it is not possible to total the cost of recovery. Cost estimates have been made for some of the recovery tasks. Over the next 3 years, the projected total of these tasks is $99,000.

Date of Recovery: Impossible to determine at this time.

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PART I: INTRODUCTION

Background

The Alabama canebrake pitcher plant (*Sarracenia rubra* Walt. ssp. *alabamensis*) (Case and Case) Schnell occurs in seeps, bogs, and swamps along the fall-line in central Alabama. Due to its rarity and vulnerability to threats, the species was federally listed as endangered on March 10, 1989 (U.S. Fish and Wildlife Service 1989). Historically, the plant has been reported from 30 sites. Now, its known distribution is limited to 12 locations. All sites are on privately-owned lands. It is included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Description and Taxonomy

This member of the pitcher-plant family is a carnivorous herb arising from a rhizome. This species produces two types of pitchers (hollow leaves) and occasional phyllodia (flattened leaves) each season. Spring pitchers, appearing with flowers, are 20 to 50 centimeters (cm) (7.9 to 19.7 inches) in length and recurved; the summer pitchers are larger (20 to 70 cm or 7.9 to 27.6 inches long) and erect. Flowers are maroon in color and borne singly on scapes up to 60 cm (2 feet) tall. The fruit is a capsule. Flowering occurs from late April through early June (Case and Case 1974, 1976; Kral 1983, McDaniel 1986, McDaniel and Troup 1982).

The first collections of this species were made during the early 1900's by Pollard and Maxon (McDaniel 1986; McDaniel and Troup 1982) and later by Harper (1918, 1922). However, Case and Case (1974) were the first to formally recognize these plants as representing a distinct taxon. There has been much disagreement regarding the proper taxonomic disposition of this taxon and the Sarracenia rubra complex in general. The subspecies "alabamensis" was not recognized by Bell (1949); McDaniel (1966, 1971) considered it a regional variant; Schnell (1977, 1978, 1979) called it a subspecies; while Case and Case (1974, 1976) and McDaniel (1986) considered it a full species. According to Case and Case (1976) and McDaniel (1986), the taxonomic confusion within the Sarracenia rubra complex in general stems from the presence of alleged "intermediates" which are actually ecologically induced variants or introgressed hybrids. Hybridization has been well documented in Sarracenia species (Bell 1952, Bell and Case 1956, McDaniel 1971). Authors agree that leaf shape is the most significant diagnostic character in Sarracenia and that the distinctiveness of Sarracenia rubra ssp. alabamensis is best displayed in its large summer pitchers which are distinctively shaped, puberulent, yellow-green in color and inconspicuously veined and aerolate in the upper portion. Moreover, members of the Sarracenia rubra complex maintain their morphological distinctiveness when grown under standardized conditions (Case and Case 1976, Schnell 1977). Nomenclature in this plan follows the most recently published determination.

Distribution, Habitat and Ecology

Populations of Sarracenia rubra ssp. alabamensis are in the Coosa River drainage of Autauga, Elmore, and Chilton Counties in central Alabama (Figure 1). No records exist for the species outside this area. Of the 12 known extant populations, four are in Autauga, six are in Chilton, and two are in Elmore. Approximately 20 populations within this area are believed extirpated.

This pitcher plant occurs on acidic, highly saturated, deep peaty sands or clays of upper Cretaceous origin (Case and Case 1974, McDaniel and Troup 1982). Common associates include cinnamon fern (Osmunda cinnamomea); pipeworts (Eriocaulon sp.); orchids (Calopogon, Cleistes, Pogonia); yellow-eyed grasses (Xyris sp.); beak rushes (Rynchospora sp.); sundews (Drosera sp.); and butterworts (Pinguicula sp.). Woody associates may include cane (Arundinaria tecta); bamboo-vine (Smilax laurifolia); sweet bay (Magnolia virginiana); alder (Alnus sp.); red maple (Acer rubrum); poison sumac (Rhus vernix); and wax myrtle (Myrica sp.). Colony sites are wet much of the year and are often characterized as wet bogs or wet flatwoods. Within this general habitat type, colony health seems to be a function of unaltered hydrology and maintenance of an early successional stage in which competing woody vegetation is limited. Naturally occurring fires and hydrological conditions controlled the pioneering of woody species on these sites. Case and Case (1974) believe Sarracenia rubra ssp. alabamensis to be more shade

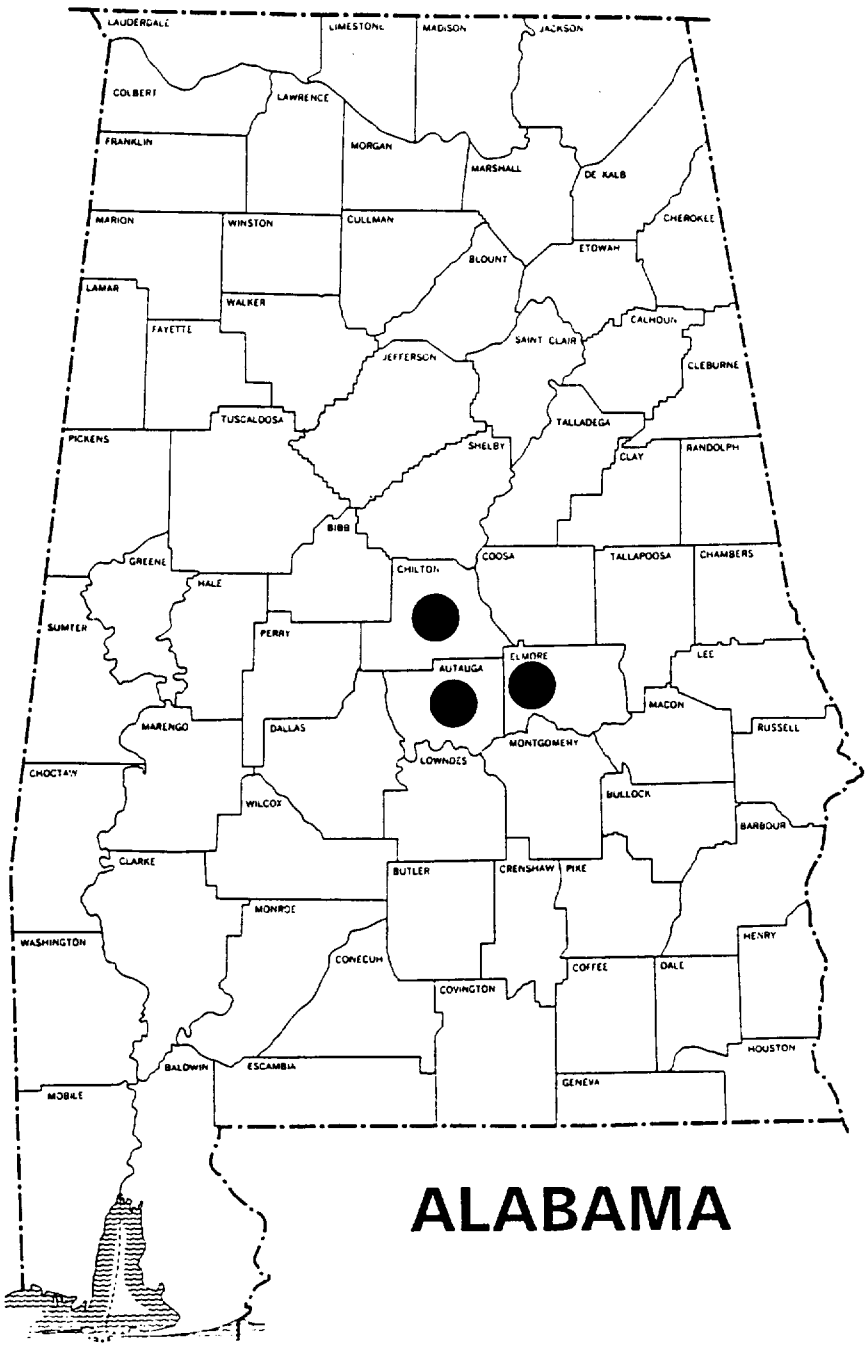

Figure 1. Known range of Alabama canebrake pitcher plant

tolerant than most other pitcher plants, but note that its most vigorous growth was attained in full sunlight.

Threats

Historically, this species occurred in open boggy areas with little woody competition (Case and Case 1974, Harper 1922). Woody succession due to altered hydrological conditions or fire suppression has been and remains a severe threat to Sarracenia rubra ssp. alabamensis. Most of the species' habitat has been destroyed or adversely modified through clearing and drainage for agricultural usage (i.e., pastureland, row crops). Overgrazing and the accompanying trampling and soil compaction are threats to certain extant populations. Construction of farm ponds on bog sites, drainage for pastureland conversion, gravel mining, herbicide spraying along rights-of-way, and collecting have cumulatively reduced populations of this rare plant to a perilous level. The species is vulnerable to possible extinction due to its limited numbers and the need for active management to maintain suitable habitat.

Conservation Measures

All known populations of the Alabama canebrake pitcher plant are located on privately-owned lands. The U.S. Fish and Wildlife Service, along with the Alabama Natural Heritage Program, is working with these private landowners

to protect and manage the sites. Conservation Agreements have been obtained for two of the larger sites and efforts are continuing to obtain additional Conservation Agreements.

Plants of Sarracenia rubra ssp. alabamensis are being artificially grown in several locations, including the Atlanta Botanical Garden and the private nurseries of a few individuals. These plants may provide material for future study and possible reestablishment. In addition, seed has been gathered from several sites by the Atlanta Botanical Garden and some will be maintained in long-term storage.

Part II: RECOVERY

A. Recovery Objective

Sarracenia rubra ssp. *alabamensis* will be considered for reclassification to threatened status when there are at least 10 viable populations within the Coosa River drainage that are assessed as viable for at least a 15-year period. Populations should have appropriate legal protection and active management such that the sites are thriving and secure from any foreseeable threats. A viable population is one which is reproducing and stable or increasing in size. The number of individuals necessary and the quantity and quality of habitat needed to meet this criterion will be determined as one of the recovery tasks.

New information may result in revision of objectives and recovery criteria. However, at this time, recovery does not appear to be a realistic goal due to the small number of populations, poor status of many of the sites, and limited amount of protection for plants on private lands.

B. Narrative Outline

1. Protect populations and habitat. The first step in recovery is to protect existing populations from present or foreseeable threats. Insuring the survival of populations will also involve active management of the habitat. Only 12 populations are known to exist

and protection should be initiated for all. However, the long-term protection of 10 populations is considered necessary for reclassification to threatened status. The location of additional populations may be needed to reach reclassification criteria due to the apparent irreversible degradation of habitat and limited protection possibilities at several sites.

1.1 Contact landowners and negotiate protection. As a first step in protection for all sites, landowners should be contacted and encouraged to protect populations on their properties. The first and highest priority should be given to the four largest populations (those containing several hundred plants). For these, the objective should be a formal and permanent means of protection and management. This objective is best met through land acquisition or conservation easements. If this option is unavailable, conservation agreements and other voluntary non-binding protective measures should be pursued. Protection from herbicide applications or construction activity should be arranged for sites near railroad rights-of-way.

1.2 Initiate interim management measures. Although specific studies are needed to determine optimal management practices for this species (see Task 3), it is known that the most vigorous populations are located in "open" areas with little woody competition. Several populations are actively declining due to woody encroachment and immediate action is needed to

reverse this trend. Management will focus on increasing the amount of sunlight to the populations through the removal of competing vegetation. Specific management actions may involve mowing, pruning woody vegetation, and/or prescribed burning.

1.3 Search for additional populations. Surveys by various individuals have been ongoing for this species for the last 20 years. However, a thorough systematic search for new populations in the Coosa River drainage is lacking and such is needed. Potential habitat can be identified by analyzing the habitat of known populations and using soil and topographic maps. Searches should be done for a minimum of two field seasons. Protection should be initiated for new populations as outlined in Task 1.1. This survey will also identify suitable habitat for reintroduction (if deemed necessary).

2. Determine habitat characteristics and conduct life history studies. An understanding of this species' ecology and life history is essential to determining what factors limit its distribution and understanding the dynamics of the population. Information gained should ensure that populations are appropriately managed and protected.

2.1 Characterize habitat. All populations should be visited in order to develop a habitat profile. An understanding of the hydrology of the habitat is important to ensuring this species'

recovery and management needs. Hydrological conditions for bogs are different and such affects the survivability of the plants (Gibson in litt. 1991). Other environmental parameters to investigate include soil characteristics and light relations. Light measurements and overstory coverage can be estimated at selected sites within populations. Information on this species' habitat can also be gained through an analysis of associated species. Thus, a list of common associates should be compiled for each site. Information obtained from these studies will aid in determining what factors maintained the habitat naturally and will assist in evaluating the suitability of potential habitat.

2.2 Conduct long-term demographic studies. Intensive demographic studies should be conducted for selected populations through the establishment of permanent plots. Populations selected should encompass the range of habitat types, including those in altered and relatively undisturbed conditions. Studies should obtain information on all aspects of this species' life cycle. These studies will aid in identifying those stages most important to population growth and will be essential to predicting future population trends and identifying management needs.

2.3 Determine life history characteristics. Determine additional life history parameters to be investigated through an analysis

of available literature and information gathered from the demographic studies. Additional information may be needed on reproduction, pollination biology, seed dormancy, seed dispersal, germination requirements and others. The relative importance of vegetative and sexual reproduction to this species' long-term survival should be assessed. This task may involve laboratory studies in addition to field studies.

3. Determine and implement appropriate management to enhance populations. Management of habitat, as well as protection, will be essential for ensuring that vigorous populations are maintained. Management will focus on removing competing vegetation and maintaining essential hydrological conditions. In addition, smaller, less vigorous populations may require augmentation of seeds or seedlings from stored, identical genetic stock if management actions alone are not effective at restoring a viable population.

   3.1 Conduct management technique experiments. Experiments should be designed to evaluate the cost and effectiveness of different management techniques. Long-term effects should be determined through observations of permanent study plots over many years. Changes in associated vegetation should be noted in addition to the response of the target species. Techniques for controlling competing vegetation include controlled burns (various rotations and seasons) and/or removal of overstory and competing vegetation by manual (hand clearing) or mechanical

means (mowing, selective timber cutting). Plants at one site appear to be stressed due to flooding from a nearby beaver dam. Removal of this beaver dam may be necessary to enhance the health of this population.

3.2 Augment existing populations, if needed. Several populations have few individuals and may require augmentation with additional seed or seedlings to increase their vigor. Augmentation should only be done with identical genetic material taken from the specific population. This task should be considered only after there has been ample time to assess the success of an active habitat management program.

3.3 Prepare individual site management plans. Make use of findings from the above research to determine the best way to maintain each individual population. Prepare management plans for each site.

3.4 Implement management plans and monitor results. Specific management actions should be implemented for sites as outlined in the site management plans. This species' response to management actions should be carefully monitored.

4. Determine parameters of a viable population. The long-term survival of the species will be ensured only if a sufficient number of viable populations are protected. This task is essential to defining

recovery criteria. The components of a viable population which need to be determined include minimum number of individuals, the size and quality of habitat, in addition to the number of populations and their geographical spacing. Information gained from the demographic and habitat studies will be essential to completing this task. The amount of genetic variability within and among populations may be important in assessing minimum viable population parameters for this species.

5. Preserve genetic stock. Protection of the gene pool should be accomplished through seed bank storage and by maintaining material in cultivation. These techniques will provide material for research, horticultural interests, reestablishment and/or augmentation (if deemed necessary). These activities should be conducted in coordination with the Center for Plant Conservation.

5.1 Establish seedbank. Seed should be collected from all natural populations. Some seed should be stored in a long-term storage facility and tested for viability every few years. Seed has been collected from several populations by the Atlanta Botanical Garden and is stored at their facility at the present time.

5.2 Maintain material in cultivation. Populations should be maintained in cultivation to provide material for research, education, and reestablishment. It is important to maintain

the genetic integrity of populations while maintaining material in cultivation. Several individuals have material in cultivation in their private nurseries.

6. Reestablish additional populations within historic range. Reestablishment of additional populations should be considered only after extensive searches for new populations have been conducted and there has been ample time to assess the progress of management actions on existing populations. Priority should be given to historic sites which still have the habitat intact and for which genetic stock from the site is available. Material from historic sites is in cultivation at several private nurseries, according to Mellichamp (in litt. 1991), and such may be available for reintroduction. As another alternative, seed could be collected from populations in the immediate vicinity of the site targeted for reestablishment and later planted at the site as seedlings or young plants.

Reestablished populations and their habitat will likely require active management. Any reestablished population should be monitored, at least annually, for a 10-year period. The number of populations to be established will be determined when the necessity of this task is assessed.

7. Develop public awareness program. Public support is an important part of recovering listed species. Articles could be written, and

an interpretative display could be established at appropriate botanical gardens. Pitcher plants are exceptionally interesting and usually generate a lot of interest and support. As with many carnivorous plants, overcollecting, in response to the commercial demand for this rare species, has significantly contributed to this species' decline. It is important to educate the public on the trade problems, with this and other carnivorous plants, and such could be accomplished in a brochure to be distributed at botanical gardens. All public education attempts should carry a strong conservation message and keep the precise location of plant sites confidential so as not to increase the threat of taking from wild populations.

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PART III: IMPLEMENTATION SCHEDULE

The following implementation schedule outlines recovery actions and their estimated costs for the first 3 years of the recovery program. It is a guide for meeting the objective discussed in Part II of this plan. This schedule indicates task priorities, task numbers, task descriptions, duration of tasks, the responsible agencies, and lastly, estimated costs.

Priorities in column 1 of the following Implementation Schedule are assigned as follows:

1 - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.

2 - An action that must be taken to prevent a significant decline in species population/habitat quality or some other significant negative impact short of extinction.

3 - All other actions necessary to provide for full recovery of the species.

Key to acronyms used in Implementation Schedule:

USFWS - U.S. Fish and Wildlife Service
FWE - Fish and Wildlife Enhancement
ALNHP - Alabama Natural Heritage Program
TNC - The Nature Conservancy (Alabama Field Office)
CPC - Center for Plant Conservation
ABG - Atlanta Botanical Garden

IMPLEMENTATION SCHEDULE

PRIORITY #	TASK #	TASK DESCRIPTION	TASK DURATION	RESPONSIBLE PARTY			COST ESTIMATES ($K)			COMMENTS/NOTES
				USFWS						
				Region	Division	Other	FY 1	FY 2	FY 3	
1	1.1	Contact landowners and negotiate protection	2 years	4	FWE	ALNHP TNC	2.0	2.0		
1	1.2	Initiate interim management	3 years	4	FWE	ALNHP	5.0	3.0	3.0	
2	1.3	Survey for additional populations	2 years	4	FWE	ALNHP	5.0	5.0		
2	2.1	Characterize habitat	2 years	4	FWE	ALNHP	4.0	4.0		
2	2.2	Conduct demographic studies	3 years	4	FWE	ALNHP	8.0	5.0	5.0	
2	2.3	Investigate life history characteristics	3 years	4	FWE	ALNHP CPC	10.0	5.0	5.0	
1	3.1 3.3	Conduct management experiments and develop management plans	5 years	4	FWE	ALNHP	12.0	6.0	6.0	
1	3.2 3.4	Implement management and monitor	ongoing	4	FWE	ALNHP	-	-	-	Cost dependent upon results of management studies.
3	4	Determine viable population parameters	1 year	4	FWE	ALNHP	-	-	-	$5,000 in future
3	5	Preserve genetic stock	ongoing	4	FWE	CPC ABG	1.0	0.5	0.5	
3	6	Reestablish populations, if needed		4	FWE	ALNHP	-	-	-	$15,000 in future, if necessary
3	7	Public education	ongoing	4	FWE	ALNHP	1.0	0.5	0.5	

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